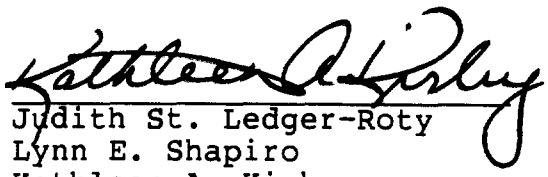
allow both large and small carriers to exist side by side while maximizing spectral, technical, and operational efficiencies.

Respectfully submitted,

PAGING NETWORK, INC.

By: 

Judith St. Ledger-Roty
Lynn E. Shapiro
Kathleen A. Kirby

REED SMITH SHAW & McCLAY
1200 18th Street, N.W.
Washington, D.C. 20036
(202) 457-8656

Its Attorneys

Dated: June 10, 1992

EXHIBIT 1

Challenges for Paging in the 1990s and Beyond

By Andrew D. Roscoe, Ellen Seiden and Elliott Hamilton

The challenge for paging companies in the 1990s is to develop new markets and technologies.

Many manufacturers, operators and industry analysts believe that the traditional markets for paging are maturing and that the future of the paging industry lies in two new markets—the consumer market and new markets created by advanced paging technology.

The paging industry will face many challenges in the 1990s, but among the most significant is the challenge to develop these new markets while maintaining and expanding present markets. We at EMCI surveyed several industry experts for this report to get their opinions on the future of the paging industry in the 1990s.

Competition

The paging marketplace has become increasingly competitive over the last four years due to the emergence of private carrier paging (PCP) and megacarriers.

Private Carrier Paging. PCP came into existence in 1986 when the Federal Communications Commission allowed business entities to provide PCP services to other businesses (Frequency Coordination Doctrine 83-733). The first frequency granted was 152.408 MHz, which was the first high-powered frequency (at 350 watts).

PCPs began using this frequency to provide wide-area paging service to businesses. Later, after lobbying efforts from NABER (the National Association of Business and Educational Radio), the FCC gave approval of another high-powered band (157.740 MHz) for PCP use.

Currently the 150 MHz, 462 MHz, and 929 MHz bands are available for PCP. The 150 MHz and 462 MHz channels provide the strongest coverage and therefore are cheaper to install because they require fewer towers. Hence, PCP has grown rapidly and become very congested in many urban markets.

Conversely, the 929 MHz band has remained fairly untapped due to a weaker signal requiring more towers to cover the same area. Traditionally, PCP has been an inroad for small entrepreneurs, many of whom were involved with two-way communications, such as SMR (specialized mobile radio).

Large carriers also started applying for the frequencies as their initial spectrum became exhausted. Many in the industry believe that radio common carriers (RCCs) will increasingly take control of PCP frequencies. Clifford Bean, a consultant for Arthur D. Little, believes that RCCs will acquire and operate PCPs as separate subsidiaries to gain needed spectrum and target niche markets. Bean also sees aggressive RCCs forming alliances with complementary service providers, such as voice mail bureaus, information service providers and database operators.

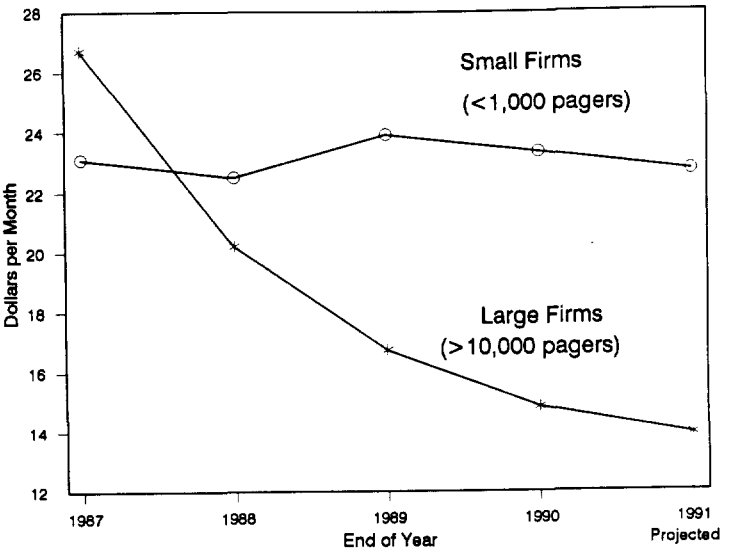
Over the next five years, more businesses are expected to apply for 929 MHz frequency. As PCPs continue to grow, management and sharing of all frequencies will become more of a problem. In May of this year, the FCC stopped taking applications for 929 MHz while it considered alternatives for managing and sharing the spectrum. The ban was recently lifted, however, due to industry pressure.

We at EMCI believe that future plans to increase the spectrum for PCPs will ensure that PCPs will become more important in the paging industry and less differentiated from RCCs.

Megacarriers. Megacarriers are a relatively recent phenomenon that have drastically altered the competitive environment in large markets. Megacarriers are the result of two factors—mergers and acquisitions and aggressive marketing strategies.

Over the past four years, many small or financially troubled paging firms were acquired or merged to form very large paging carriers. In addition, aggressive price competition has resulted in the rapid growth of such carriers as PageNet and market dominance in the markets where they operate.

Megacarriers, thus far, are focusing on the top 30 markets where they can achieve economies of scale in such areas as overhead, purchasing, advertising and sales. The numbers of megacarriers are expected to increase during the 1990s; this will result in many smaller operators finding it harder to survive. Bill Hemenway at NEC's mobile phone and paging division believes that in ten years, there may be very few smaller paging companies because of the expansion of RCCs.



Declining revenues per rental digital pager for large firms primarily in top 30 markets versus smaller firms primarily in small and rural areas. Source: EMCI, Inc., based on Telocator / EMCI annual paging survey

The success that megacarriers have had by competing on price and volume, however, also makes it certain that niche markets will be present that do not depend upon large economies of scale for success. EMCI believes that smaller operators increasingly have to target key customer segments or run the risk of competing head-on with the megacarriers and losing.

Alphanumeric paging is one niche market available to small operators due to the fact that megacarriers are focusing their efforts primarily on digital display pagers. Alphanumeric paging does not fit into the megacarriers' plans because it is a more difficult sale and does not represent economies of scale.

Presently, alphanumeric paging represents less than 5% of the total paging market. EMCI knows of many smaller firms that have achieved great success with alphanumeric paging by intensively marketing the service in key business sectors.

Another niche market available to smaller operators will be ethnic markets in large cities. Certain paging carriers are already targeting the Hispanic or Asian ethnic groups by conducting bilingual marketing and sales programs and acquiring a great deal of knowledge about their potential customer base.

EMCI also believes that smaller metropolitan and rural markets will continue to be very good growth markets for small operators and that they offer very good opportunities for carriers who can rationalize operations over large geographic areas.

Smaller markets are more immune from aggressive price competition from megacarriers because the markets do not have the economies of scale to make such pricing tactics economically feasible. Many smaller markets and rural areas will also have higher growth prospects than the larger markets because of accelerating population bases and historically lower penetration rates.

New Markets

The paging industry has shown tremendous growth over the last four years, resulting in over four million new subscribers. Many in the paging business, as well as industry analysts including EMCI, believe that the traditional business market for paging is

reaching a maturity stage.

In addition to growth prospects diminishing, revenues per pager will continue to fall due to competition from within the industry and from other competing mobile communications, including future PCN (personal communications network) systems. However, new markets are on the horizon that will offer much greater prospects for future growth.

Consumer Markets. The personal paging market is currently in its infancy. Motorola and certain large carriers are conducting market tests to find the right combinations of price, promotion and distribution that would make this market viable. In an attempt to capture the personal paging market, carriers are marketing through retail electronic and consumer stores, such as Sears Office Centers.

Manufacturers such as Motorola have repackaged their pagers in a variety of colors and have targeted promotions to parents and young people who want the ability to stay in touch. EMCI believes that the large manufacturers and carriers will have to do more groundwork for the consumer market and prove that it is a viable market before there will be much interest expressed by smaller carriers.

One potential problem in this market is having a pager priced low enough for the consumer. Many people believe that the consumer market will not exist until the price of a pager goes well below $100. Another problem is the expected higher churn that will be associated with consumer use.

A third problem involves changing the regulatory environment in many states and cities that have attempted to ban young people from obtaining pagers because of the perception that pagers are associated with drug use. Telocator currently is working to improve the image of pagers through a public relations campaign. (See story on p. 20.)

EMCI believes that for consumer paging to be a viable market, there needs to be a much higher level of awareness among consumers concerning pagers and their benefits.

"There needs to be a much higher level of awareness among consumers concerning pagers and their benefits."

One way to accomplish this goal is through a coordinated promotion and awareness campaign, conducted under a standardized identifying logo and message, that enables individual carriers to market and promote their services in their own markets along with national advertising by the industry.

New Technologies

The most promising area for paging to expand its markets in the future lies in new technologies that offer advanced features and services.

Advanced One-Way Communications. One current trend is for paging operators to offer advanced one-way data communications services, such as point-to-point and point-to-multipoint data transfers. Point-to-point paging applications include downloading spreadsheets to an end-user, whereas point-to-multipoint paging sends data to more than one end-user. Basically, the pagers act as a wireless modem without all the functions (i.e., error correction).

Many industry leaders believe that the next decade will result in pagers becoming more integrated with other technologies, such as personal computers.

For example, Bill Collins, president of First Page, told us, "A major impact on operations in the future will be seen with the integration of computers and paging devices, providing the opportunity for downloading information and for enhanced alphanumeric paging services, areas where I believe we will see increased innovation and usage." Collins cites as an example the integration of First Page's 900 MHz paging system with Motorola's nationwide system for laptops and notebook computers.

One of the drawbacks to alphanumeric paging is the entry system that currently requires a user to have an integrated computer keyboard system or go through an operator. This situation may change as voice recognition technology allows a user to send an alphanumeric message directly by speaking the message.

National Semiconductor Corp. recently announced it had developed an $18 voice processor and voice recognizer that could be used for paging. Collins says that "The introduction of a sophisticated voice recognition system for alphanumeric pages could change the face of the industry from digital to alphanumeric paging."

Two-Way Communications. Two-way pager communications are currently being developed that could alter the paging industry, allowing it to compete much more aggressively with other two-way communications technologies, such as cellular and PCN.

Two-way communications for paging could be either a limited two-way service that allows the page receiver to respond that he has received the message, or full two-way service that allows a pager to send back data to the host.

Two-way communications essentially transform the pager from a passive receiver into an active receiver. Bill Hemenway from NEC says that for the pager to develop into a competitive data communications product, two-way communications must be developed.

FCC Regulation

The development of two-way technologies partly depends upon receiving frequency allocation from the FCC. Hemenway states that the bounty of new services being developed for pagers raises questions about what qualifies as a pager under current FCC guidelines. Assuming that the FCC does allocate frequencies, Hemenway says, two-way communications for pagers could be a reality in five to seven years.

A number of paging carriers and Telocator recently petitioned the FCC to allocate the 930 to 931 MHz frequency band to the development of new paging services. PacTel Paging petitioned the FCC to create a new service called Advanced Architecture Paging, which would offer enhanced one-way services, such as low- and high-resolution graphics, video, electronic mail, fax, digitized voice, alphanumeric messages and the ability to encrypt messages.

DialPage also petitioned the FCC to allocate these frequencies to a paging service that would allow pagers to acknowledge they have received the message. DialPage says this would be accomplished by having a tiny transmitter built into the pager that would be activated automatically. Mtel wants to use the same frequencies for a high-speed two-way messaging service in which laptop computers could receive and send back messages.

Clifford Bean of A.D. Little sees the introduction of new two-way messaging integrated terminals that can handle voice mail, E-mail and voice-to-text conversions as key to the paging industry remaining competitive with cellular, PCN, SMR and mobile data. Bean says that the other technologies currently offer greater functionality than paging at prices approaching alphanumeric paging.

Conclusion

While the paging industry is currently undergoing tremendous growth, mainly through digital display pagers, the long-term success of the industry will depend on new markets and technologies. The growth potential of digital display pagers to businesses is already reaching maturity penetration levels and will thus produce lower revenue potential.

The consumer market offers one vast new market, but carriers and manufacturers have to do much groundwork before that market is ready to take off. Smaller operators will have the best potential in niche markets, such as alphanumeric paging, services targeted to ethnic communities, and operations in small and rural markets.

The biggest changes to come in the paging industry will come from future technologies, such as speech recognition devices for alphanumeric paging and two-way messaging paging services. ■

Andrew D. Roscoe is president of EMCI (Economic and Management Consultants International, Inc.), Ellen Seiden is a senior consultant, and Elliott Hamilton is a senior consultant for the Washington, D.C.-based consulting firm. EMCI also wishes to thank Bill Collins, president of First Page, Bill Hemenway from NEC, Clifford Bean of Arthur D. Little, and NABER for their input.

BEFORE THE

Federal Communications Commission

WASHINGTON, D. C.

In the matter of:	)	
Amendment of Section 90.494 of	)	
the Commission's Rules and	)	RM -7986
Regulations Concerning Shared Use	)	
of the 900 MHz Paging Frequency	)	

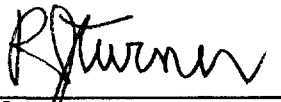
DECLARATION

I, Ronald J. Turner do hereby declare that:

1. I am Paging Network, Inc.'s Director of Systems and Management. My business address is 4965 Preston Park Blvd., Suite 500, Plano, Texas 75093.

2. I have reviewed the Comments of Paging Network, Inc. in Support of the Petition for Rulemaking Filed by the Association for Private Carrier Paging, dated June 10, 1992, in the above-captioned proceeding. The facts set forth therein are true and correct to the best of my knowledge, information and belief.

This declaration is made under penalty of perjury under the laws of the United States of America.



Ronald J. Turner

Dated: June 10, 1992

CERTIFICATE OF SERVICE

I, Kathleen A. Kirby, hereby certify that on this 10th day of June 1992, a true copy of the foregoing **Comments of Paging Network, Inc. In Support Of Petition For Rulemaking Filed By The Association For Private Carrier Paging** was mailed, first class, postage prepaid to:

Michael Cutler, Chairman
Association for Private Carrier Paging
1501 Duke Street, Suite 200
Alexandria, Virginia 22314

David E. Weisman, Esquire
Alan S. Tilles, Esquire
Meyer, Faller, Weisman and Rosenberg, P.C.
4400 Jenifer Street, N.W.
Washington, D.C. 20015

Kathleen A. Kirby